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Correspondence

Cadaveric fungi: Not yet an established forensic tool

Dear Editor,

Forensic mycology[1] is a broad field where fungal science and the judicial system interact. The application of field mycology in the location of scenes of crime concealed in forest ecosystems, and as a potential tool to assist in the estimation of post-burial interval in forensic investigations involving clandestine grave sites, has been suggested by Carter and Tibbett.[2,3] They[3] reported that fungi provide visible markers of the sites of cadaver decomposition and follow repeated patters of successional change as apparent decomposition proceeds.

Indeed there is a growing interest in suggesting the potential forensic use of fungi detected on human cadavers too. To the best of our knowledge, for the first time Ishii et al.[4] described in detail the taxonomical determination of species of fungi detected on human cadavers, and the forensic implications of cadaveric fungi have already been questioned.[1] In a recent article entitled ''Fungi can be a useful tool'', Hitosugi et al.[5] presented a medicolegal autopsy case in which fungi detected on a human cadaver contributed in estimating postmortem interval. To be accepted by the practicing forensic fraternity, however, the scientific basis for the same has not been satisfactorily explained by Hitosugi et al.[5] Therefore, the use of cadaveric fungi as a forensic tool in estimating time since death at autopsy as reported in the aforementioned case may not be applicable without any appropriate reasoning. In the absence of data about the rate of growth of fungi on human cadavers or other cadavers, and the factors influencing their growth on cadavers, it is not scientific to note that cadaveric fungal evidence indicated that the deceased had been dead for about 10 days. The authors[5] probably estimated time since death as 10 days based on changes in the body after death and corroborative police information, and not on cadaveric fungal evidence.

We emphasize that additional practical forensic case series analyzing the fungal growth on human cadavers at different climatic conditions, and experimental studies should be reported to broaden our knowledge of their biology and behaviour in forensic cases, and to encourage a high level of competency in the field of forensic mycology before it is put into forensic practice. However, the use of human cadavers for detailed decomposition studies and cadaveric fungal development is generally not legal or practical. Therefore, a substitute decomposition subject may be required to be used for experimental forensic mycology, and to further substantiate cadaveric fungi as a forensic tool in estimating time since death. Prior to directly relating cadaveric fungi to scientific estimation of postmortem interval, emphasis should be made on the pattern and rate of growth of fungal species on cadavers. Estimation of time since death becomes a challenging task as the postmortem interval increases. Forensic entomology is a well established science that helps in estimation of postmortem interval.[6] The same should in no way be compared to cadaveric mycology until its utility is scientifically proved reliable beyond doubt.

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The significant correlation of annual suicide rates with unemployment rate among males resulted in the rapid increase of the number of suicides in Gifu Prefecture, Japan, between 1990 and 2000

To the editor

The number of suicides in Japan has increased from about 22,000 per year in 1988–1997 to over 30,000 per year since then. This number has also been increasing in Gifu Prefecture. Japan's bubble economy collapsed in about 1990, and the unemployment rates increased rapidly since 1998.[1] Yoshioka conducted a large-scale study of suicide throughout Japan, covering the 7-year period between 1989 and 1995.[2] He reported that economic difficulties, including unemployment, are an important factor in increased suicide rates. Additionally, many researchers[1–3] consider increasing unemployment to be a major contributor to the number of suicides; however, thus far, this has not been proved in Gifu Prefecture.

In this report, we examined the suicide rate and all the suicide cases in Gifu Prefecture in 1990–2000, in cooperation with Ministry of Health, Labour and Welfare (Table 1 and Fig. 1). Further, we investigated the unemployment rates throughout Japan in 1990–2000, in cooperation with the Department of Work (Fig. 1). The annual unemployment rate of the entire Japanese population and the unemployment rate are available for each prefecture every five years; however, the annual unemployment rate is unavailable in each prefecture. Therefore, we calculated the correlation between the unemployment rate every five years in the total population and that in Gifu Prefecture, for each sex. The correlations for men and women were $r = 0.96$ and $r = 0.94$, respectively. Accordingly, we considered that the unemployment rate in the total population reflected the unemployment rate in Gifu Prefecture.

We focused on the correlation of annual suicide rates in Gifu Prefecture in 1990–2000 with the unemployment rate in Japan in 1990–2000. Statistical analysis was performed using single regression analysis.

Table 1
The number of suicides in Gifu Prefecture, Japan, in 1990–2000: (population)

Year	Total	Male	Female
1990	370	201	169
1991	310	179	131
1992	365	220	145
1993	354	201	153
1994	365	228	137
1995	343	195	148
1996	339	214	125
1997	396	259	137
1998	511	339	172
1999	495	323	172
2000	489	323	166

During the test period, 2682 males and 1655 females committed suicide. The suicide rates for males and females were 24.2 and 14.1, respectively, per 100,000 population.

The annual suicide rates for the total population correlated significantly with the unemployment rates: $r(11) = 0.86$, $F_{(1,9)} = 24.73$, and $p < 0.001$ ($y = 2.91x + 9.59$). The rates for males correlated significantly with the unemployment rates: $r(11) = 0.91$, $F_{(1,9)} = 41.35$, and $p < 0.001$ ($y = 4.77x + 8.67$). However, the rates for females did not correlate with the unemployment rates: $r(11) = 0.41$ and $p = 0.21$ ($y = 0.78x + 11.52$).

The unemployment rate is particularly relevant to increased suicides among males. When we analyze these data in detail, we can mention that the annual suicides were relatively static in the first few years of the study and later increase was approximately 50% in the subse-

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